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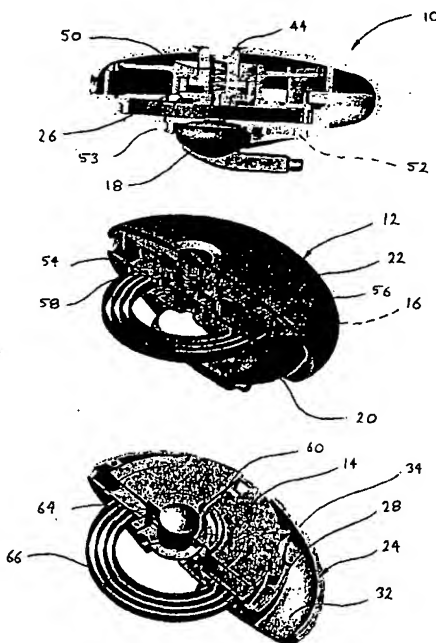
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(54) Title: **AN AUDIO CORD RETRACTOR**



(57) Abstract: The invention relates generally to an audio cord retractor (10) comprising a housing (12) in which a spool (14) is rotatably mounted. The spool (14) is adapted to engage an audio cord (16) approximately midway along its length, and the audio cord (16) is wound or wrapped about the spool (14). The housing (12) is of a split construction having a pair of upper and lower housing components (22 and 24), respectively. The spool (14) is rotatably mounted within a cavity defined between the upper and lower housing components (22 and 24). A torsion spring (66) together with a ratchet mechanism acts as retraction means which allows rotation of the spool (14) to effect retraction of the audio cord (16). The audio cord retractor (10) is in operation designed to "float".

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AN AUDIO CORD RETRACTOR

FIELD OF THE INVENTION

The present invention relates generally to an audio cord
5 retractor such as that suitable for use with a "hands-
free" audio cord of a mobile phone.

BACKGROUND TO THE INVENTION

US patent No. 5684883 relates to a device for receiving an
10 earphone/microphone wire of a holdfree handset. The device
includes a housing in which an upper and a lower reel are
rotatably mounted. The lower reel is formed from upper and
lower discs which are connected coaxially with a central
hollow shaft. An annular rib extending from the upper disc
15 is press fit within a corresponding annular rib. Thus, an
upper and a lower clearance is defined between the upper
reel and the upper disc and the upper and lower discs. As
best shown in Figure 5 a relatively large portion of an
earphone/microphone wire is coiled about the upper
20 clearance of the upper reel whereas a remaining portion of
the wire is coiled about the lower clearance of the lower
reel. The earphone/microphone wire is thus permanently
housed within the housing to allow retraction of the
earphone/microphone wire. The device of US 5684883 suffers
25 from at least the following drawbacks:

- i) the device is manufactured with the
earphone/microphone wire in place and does not allow
for replacement or assembly of the wire by the user;
and
- 30 ii) the device is specifically designed with two reels
about which the earphone/microphone wire is coiled and
in this regard is relatively complicated in
construction.

SUMMARY OF THE INVENTION

According to the present invention, there is provided an audio cord retractor comprising:

- 5 a housing of a demountable construction in which a spool is rotatably mounted, the spool being adapted to releasably engage the audio cord along its length wherein the audio cord can be removably fitted to the spool with its opposite free ends protruding from the housing; and
- 10 retraction means operatively coupled to the spool wherein actuation of the retraction means effects rotation of the spool around which the audio cord is thus coiled in overlapping relationship wherein its opposite free ends are both retracted toward and adjacent the housing.
- 15 Generally the spool is adapted to engage the audio cord approximately midway along its length.

Typically, the audio cord retractor is designed to "float" wherein the housing remains approximately midway along the

20 length of the audio cord during extension or retraction of either or both ends thereof.

Preferably, the retraction means comprises biasing means operatively coupled to the housing and the spool, the

25 biasing means being arranged to urge rotation of the spool in a first rotational direction thereby coiling or uncoiling the audio cord from the spool. More preferably, the biasing means includes a torsion spring having one end connected to the spool and an opposite end being arranged

30 to engage the housing.

Typically, the retraction means also comprises a ratchet mechanism being configured to releasably engage the spool to restrict its rotation in the first direction, actuation

35 of the ratchet mechanism releasing it from the spool which

- 3 -

is rotated in the first direction wherein the audio cord is retracted. More typically, the ratchet mechanism includes a button having a series of teeth arranged about its periphery, at least one of said teeth being configured to engage the spool to restrict its rotation, and a spring being positioned between the button and the housing to urge the button into engagement with the spool.

Preferably, the housing is of a split construction having a pair of housing components which are pressed together to rotatably house the spool. More preferably, the housing includes a shaft about which the button is axially received, the spool being journaled about the button.

Typically, the housing and/or the spool is constructed of a plastics material.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to achieve a better understanding of the nature of the present invention, several preferred embodiments of an audio cord will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 depicts "cut away" views of one embodiment of an audio cord retractor;

Figure 2 illustrates exploded views of the audio cord retractor of Figure 1; and

Figure 3 shows various views of the assembled audio cord retractor of Figures 1 and 2.

30

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As best shown in Figures 1 or 2, there is an audio cord retractor 10 comprising a housing 12 in which a spool 14

- 4 -

is rotatably mounted. The spool 14 is adapted to be engaged by an audio cord 16 approximately midway along its length, and the audio cord 16 is wound or wrapped about the spool 14. The audio cord 16 of this embodiment is a
5 "hands-free" audio cord of a mobile phone or cell phone, the cord 16 being of a conventional construction and including an ear piece 18 and a microphone 20.

The housing 12 is of a split construction having a pair of
10 upper and lower housing components 22 and 24, respectively which in this embodiment are hingedly connected to one another. These components 22 and 24 are cup-shaped and designed to press-fit together with the spool 14 contained therein. The housing 12 includes an axially disposed
15 spigot 26 which is configured to press fit onto an inner surface of the lower housing component 24 and is partly surrounded by an intermediate perimeter wall 28. An annular cavity 30 defined between the spigot or shaft 26 and the intermediate wall 28 is designed to receive the
20 spool 14. An outer annulus or race 32 is defined between the intermediate wall 28 and an outer wall 34 of the cup-shaped housing elements 22 and 24. The outer race 32 is designed to receive, and provides a passageway for, the audio cord 16. A pair of openings 40 and 42 are formed
25 opposing one another in the outer wall of the housing 12. One of the openings 40 is relatively large and sized to permit seating of the microphone 20, whereas the other opening 42 is adequately sized to allow passage of the audio cord 16. A pair of dowels 36 and 38 are provided in
30 the lower housing element 24 either side of the other opening 42. These dowels 36 and 38 provide a bearing surface for the audio cord 16.

The upper housing element 22 includes an axial opening through which a button 44 passes. The button 44 has a flange 46 formed about its base. The flange 46 has a series of teeth 48 formed about its upper facing surface.

5 The button 44 is hollow and designed to receive a compression spring 50. One end of the compression spring 50 engages the button 44, whereas an opposite end bears against the lower housing element 24. At least one of the teeth 48 of the button 44 is designed to engage a
10 corresponding protruberance (not shown) formed in the spool 14. The lower housing element 24 on its exterior surface includes a cavity 52 in which an ear piece receptor 53 is press-fitted. The ear piece receptor 53 includes a recess 55 shaped complementary to the ear piece
15 18 which can thus conveniently be pressed into the recess 55 for storage.

The spool 14 as best shown in Figure 2 includes a central tubular boss 54 which is formed together with opposing and
20 radially extending side walls 56 and 58. The side walls 56 and 58 are circular in shape and designed to retain the audio cord 16 in its coiled or retracted position. The upper wall 56 includes opposing radial slots 60 and 62 through which a middle portion of the audio cord 16 is
25 received. A semi-circular shaped channel 64 extends about the tubular boss 54 and interconnects the opposing slots 60 and 62. In operation, the audio cord 16 is divided roughly in half with its mid portion laid into the semi-circular channel 64. The audio cable 16 is then coiled
30 about the spool 14 having been fed through the opposing slots 60 and 62.

- 6 -

The audio cord retractor 10 of this particular example also includes a torsion spring 66 having multiple turns and being configured to locate within the annular recess or cavity 30 beneath the spool 14. An innermost end of the spring 66 is connected to the spool 14 with an outermost portion or end of the spring 66 engaging the intermediate wall 28. The torsion spring 66, together with the ratchet mechanism acts as the retraction means which allows rotation of the spool 14 to effect retraction of the audio cord 16.

In order to facilitate a further understanding of the audio cord retractor 10 of this embodiment of the invention, its operation will now be described. The general steps involved in "loading" of the audio cord and its operation, together with the retractor are as follows:

- i) the upper housing element 22 is removed from the lower housing element 24 so as to expose the spool 14 and the outer race 32 of the housing 12;
- ii) the spool 14 is rotated counter clockwise against the biasing force of the torsion spring 66 with the ratchet mechanism serving to prevent its subsequent rotation in a clockwise direction;
- iii) the audio cord 16 is divided approximately in half with its mid-section 14 laid within the semi-circular channel 64 and split on opposing sides of the spool 14 via the opposing slots 60 and 62 formed within the upper wall 56;
- iv) opposing end portions of the audio cord 16 are led from the respective openings 40 and 42 of the housing 12 via the outer race 32;

- 7 -

- v) the upper housing element 22 is press-fit against the lower housing element 24 so that the audio cord retractor is re-assembled;
- vi) the button 44 is depressed wherein the ratchet mechanism releases the spool 14 which rotates under the force of the torsion spring 66 and retracts the audio cord 16.

The audio cord retractor 10 is then in operation designed to "float". That is, in this particular embodiment, the ear piece 18 and microphone 20 are drawn from the spool 14 with an opposing end portion of the cord 16 being fed from the cord retractor 10. The cord retractor 10 thus remains approximately midway along the extended length of the audio cable 16 which is withdrawn its required length. In order to retract the audio cord 16, the button 44 is simply depressed wherein the ratchet mechanism releases the spool 14 and retracts the audio cord 16.

Now that several embodiments of the present invention have been described in some detail, it will be apparent to those skilled in the art that the audio cord retractor has at least the following advantages:

- i) the audio cord retractor provides a relatively quick and effective way of both extending and retracting an audio cord;
- ii) the audio cord retractor is relatively compact & light in construction and unobtrusive in operation; and
- iii) the audio cord retractor uses the existing or conventional audio cord without requiring additional electrical connections.

- 8 -

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. For example, the audio cord retractor is not limited to its application with mobile or cell phones, but rather extends to other applications such as an audio cord of a Walkman or the like. In this case, the housing may be provided with two recesses for the storage of the pair of ear pieces. The housing and spool may be constructed of practically any material, although a plastics material is preferred. The retractor means may vary from that described provided it effects rotation of the spool.

All such variations and modifications are to be considered within the scope of the present invention, the nature of which is to be determined from the foregoing description.

It is to be understood that, if any prior art information is referred to herein, such reference does not constitute an admission that the information forms a part of the common general knowledge in the art, in Australia or any other country.

- 9 -

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An audio cord retractor comprising:
a housing of a demountable construction in which a
5 spool is rotatably mounted, the spool being adapted to
releasably engage the audio cord along its length wherein
the audio cord can be removably fitted to the spool with
its opposite free ends protruding from the housing; and
retraction means operatively coupled to the spool
10 wherein actuation of the retraction means effects rotation
of the spool around which the audio cord is thus coiled in
overlapping relationship wherein its opposite free ends
are both retracted toward and adjacent the housing.
- 15 2. An audio cord retractor as defined in claim 1 wherein
the spool is adapted to engage the audio cord
approximately midway along its length and the retractor is
designed to "float" wherein the housing remains
approximately midway along the length of the audio cord
20 during extension or retraction of either or both ends
thereof.
- 25 3. An audio cord retractor as defined in claim 1 or 2,
wherein the retraction means comprises biasing means
operatively coupled to the housing and the spool, the
biasing means being arranged to urge rotation of the spool
in a first rotational direction thereby coiling or
uncoiling the audio cord from the spool.
- 30 4. An audio cord retractor as defined in claim 3 wherein
the biasing means includes a torsion spring having one end
connected to the spool and an opposite end being arranged
to engage the housing.

5. An audio cord retractor as defined in claim 3 or 4 wherein the retraction means also comprises a ratchet mechanism being configured to releasably engage the spool to restrict its rotation in the first direction, actuation of the ratchet mechanism releasing it from the spool which is rotated in the first direction wherein the audio cord is retracted.
6. An audio cord retractor as defined in claim 5 wherein the ratchet mechanism includes a button having a series of teeth arranged about its periphery, at least one of said teeth being configured to engage the spool to restrict its rotation, and a spring being positioned between the button and the housing to urge the button into engagement with the spool.
7. An audio cord retractor as defined in claim 6 wherein the housing includes a shaft about which the button is axially received, the spool being journaled about the button.
8. An audio cord retractor as defined in any one of claims 3 to 7 wherein the housing is of a split construction having a pair of housing components which are pressed together to rotatably house the spool.

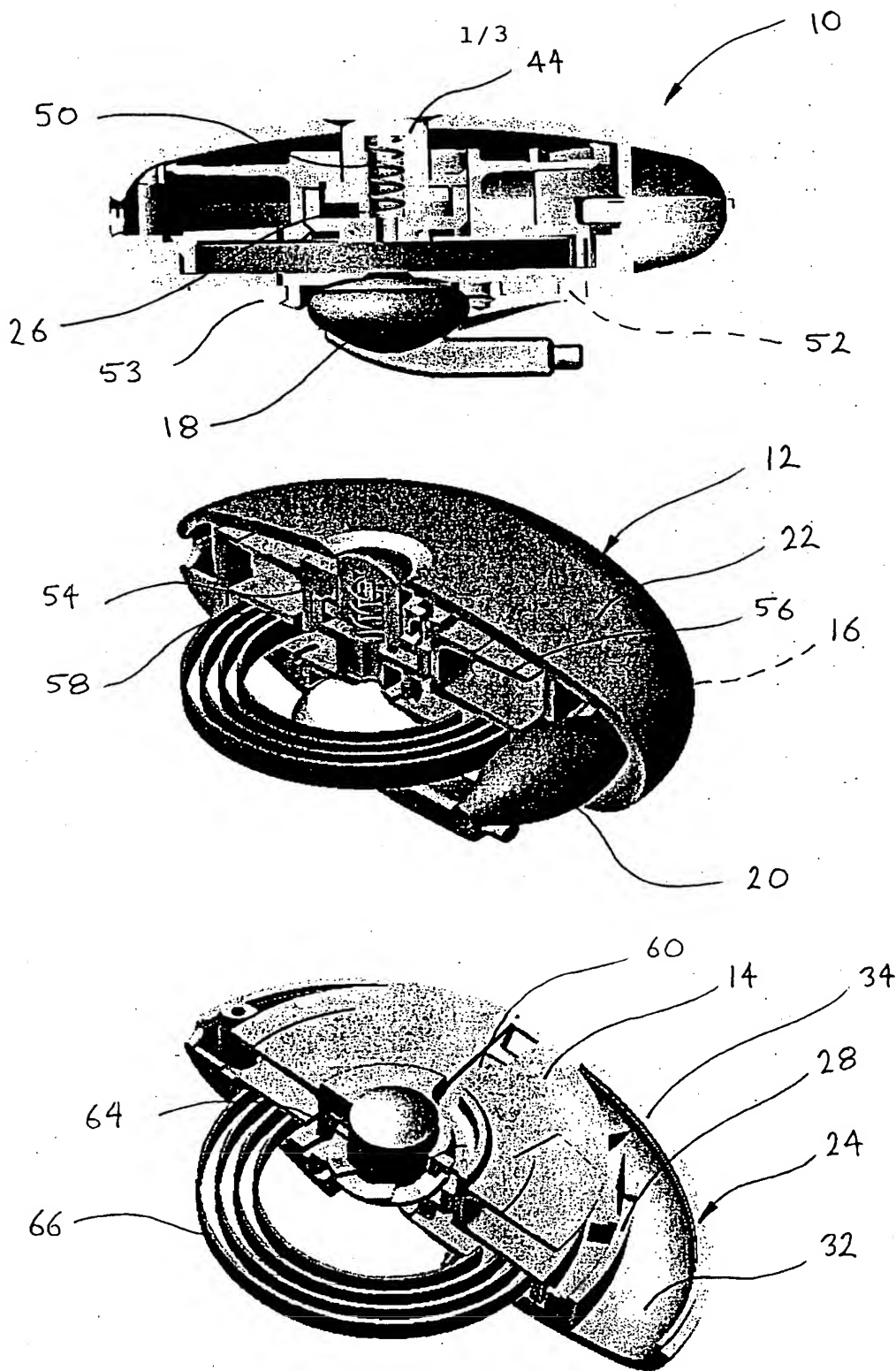


FIG 1

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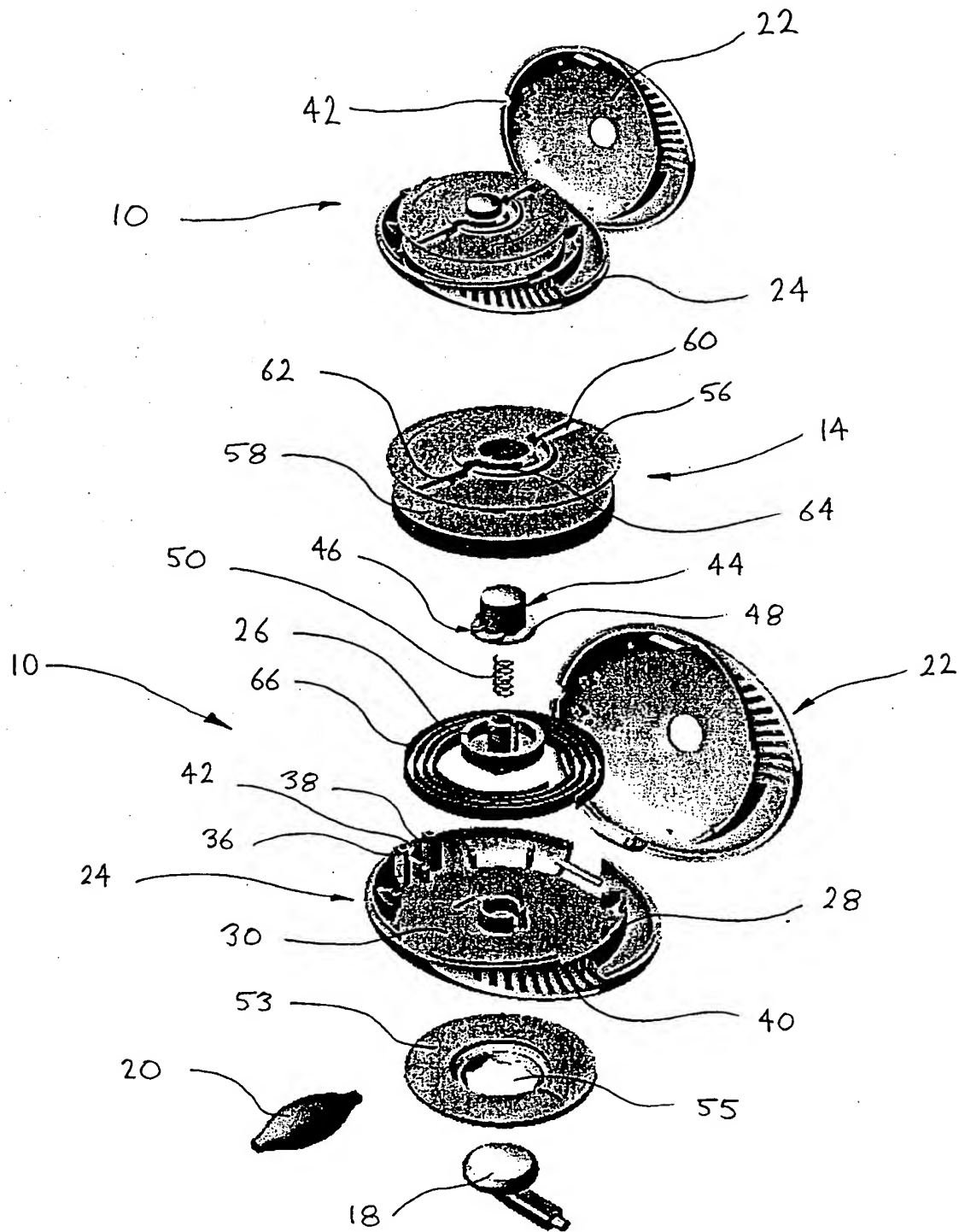


FIG 2

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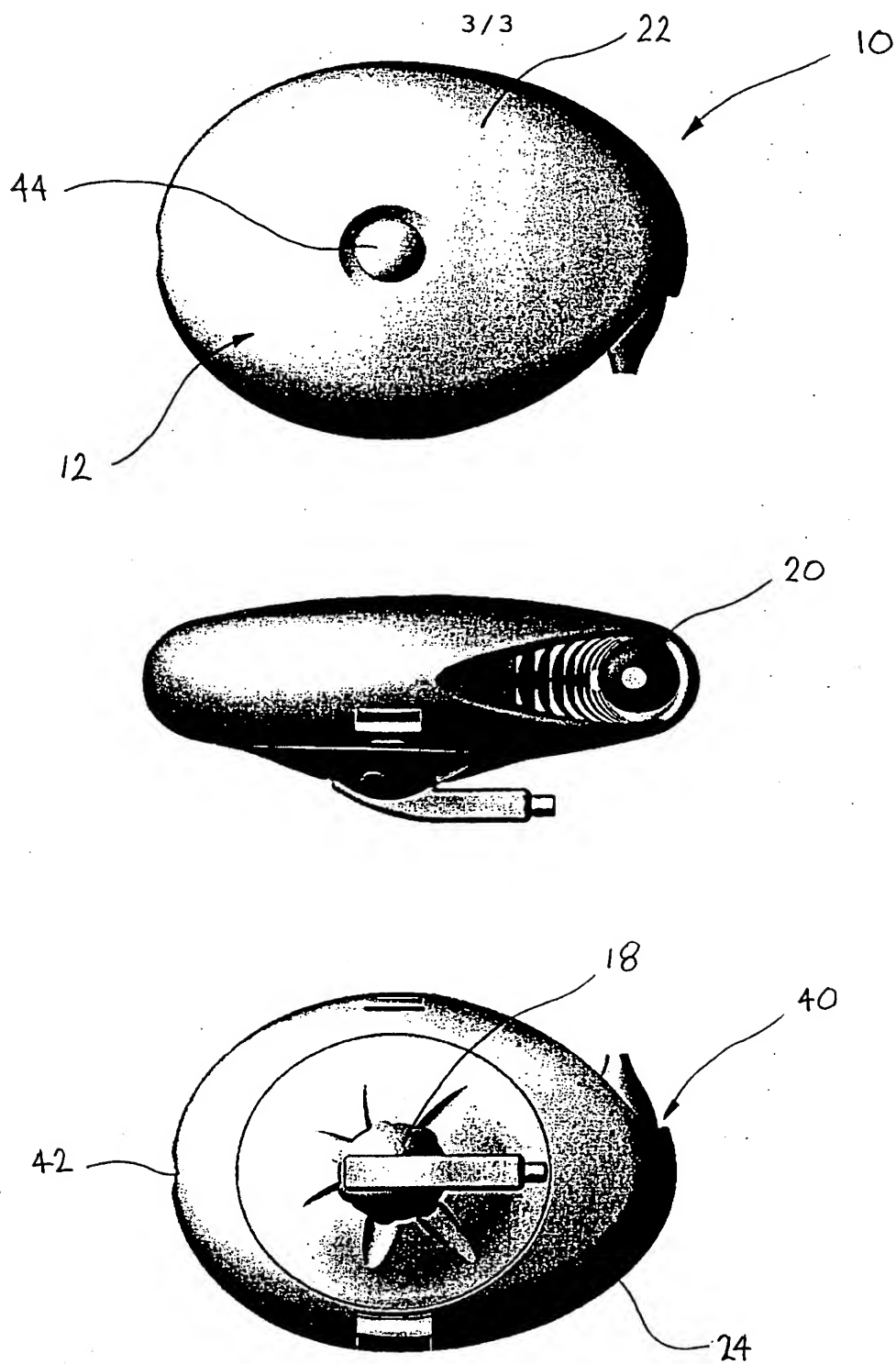


FIG 3

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